SOUTHWEST
APPLIED TECHNOLOGY COLLEGE

COURSE OUTLINE & OBJECTIVES

Offered by the Southwest Applied Technology College (SWATC), this 60-hour online course provides a basic understanding of battery-based solar photovoltaic (PV) systems based on the NABCEP PV Entry Level Learning Objectives and the 2014 National Electrical Code (NEC). During the online training, students will learn the theory behind energy storage, including identifying how much energy is lost when charging and discharging batteries. At the completion of this course, students will have gained the necessary skills to design a simple residential-sized battery-based solar PV system using solar PV modules, charge controller(s), batteries, inverter(s), and balance of system components (BOS).

Prerequisites:

- Solar Fundamentals 1A – Grid-Direct Solar Photovoltaic Systems or with special permission from the instructor.

NABCEP Topics:

- Electrical Basics – Conductors, Conduits, & Enclosures
- System Components – Inverters, Chargers, Charge Controllers, & Energy Storage
- PV System Sizing Principles – Electrical Loads, Batteries, & Charge Controllers
- PV System Electrical Design – Overcurrent Protection, Disconnects, & Grounding
- PV System Mechanical Design – Mechanical Loads, Installation Requirements, & Weather Sealing
- Performance Analysis, Maintenance, & Troubleshooting – Output Projections, Points of Failure, & Corrective Actions

Book(s):

- Photovoltaic Systems (Third Edition) by James P. Dunlop (Provided in Solar Fundamentals 1A)

Registration:

- Cost includes online instruction.
- Registration & payment must be completed at least two weeks prior to the course start date.
- To register, contact Nichole Topham at (435) 865-3911.

Upon completion of Solar Fundamentals 1A & 1B, students will meet the training requirements to take the NABCEP PV Entry Level Exam. The cost of the NABCEP PV Entry Level Exam is not included in the course fees and is considered a separate cost.

National Electrical Code (NEC) Topics:

- 110.26 – Spaces About Electrical Equipment
- 200.6 – Means of Identifying Grounded Conductors
- 240.6 – Standard Ampere Ratings
- Table 250.66 – Grounding Electrode Conductors
- 250.119 – Identification of equipment Grounding Conductors
- Table 250.122 – Equipment Grounding Conductors
- 310.15 – Ampacities for Conductors
- 310.104 – Conductor Constructions and Applications
- 690.5 – Ground-Fault Protection
- 690.9 – Overcurrent Protection
- 690.10 – Stand-Alone Systems
- 690.15 – Disconnection of Photovoltaic Equipment
- 690.41 – System Grounding
- 690.43 – Equipment Grounding
- 690.47 – Grounding Electrode System
- 690.56 – Identification of Power Sources
- 690.71 – Installation of Storage Batteries
- 690.72 – Charge Control
- 690.74 – Battery Interconnections